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perimentally the two molecular arrangements of varieties of ordinary light weight hydrogen (atomic weight 1) which are known as parahydrogen and orthohydrogen.

To a large extent the work on atom theory for which the 1933 physics Nobel prize is divided between Profs. Schroedinger and Dirac is built upon the foundations of Heisenberg's work. The French physicist de Broglie, also a Nobelist, conceived the idea of the wave mechanics brand of physics which was utilized by Prof. Schroedinger who, by a different route, carried that idea much further.

Prof. Dirac was doing his graduate work at Cambridge when the great blaze of theoretical advance was set alight by Heisenberg's first paper of the autumn of 1925. Developing his

own mathematics, using unconventional methods of remodeling the mathematical methods of physics, as exemplified by his invention of "q numbers," Prof. Dirac produced a still more advanced system of quantum mechanics. Perhaps his most strikingly original and successful contribution is his relativistic theory of the electron. When just over 30 years of age Prof. Dirac was appointed to the highly prized Lucasian chair of mathematics at Cambridge.

Although until recently the Viennaborn Prof. Schroedinger held the chair of theoretical physics at the University of Berlin, to which he was appointed in 1927, he now finds work at Oxford more congenial than in the present atmosphere of Berlin. He made an enforced departure from Germany due to the present political regime and last month he was elected to fellowship in Magdalen College at Oxford.

Science News Letter, November 18, 1933

ARCHAEOLOGY

149 Old Shoes Found in One Prehistoric Apartment

A ROW of 149 old shoes would make an impressive sight, anywhere. When you find 149 old shoes worn in prehistoric times, and all collected from a single dwelling, that is something to stir the imagination. Who wore all those shoes, and when?

This exact number of worn-out sandals has been discovered by University of Texas archaeologists who explored the earthen floor of a prehistoric rock shelter apartment. The address of the apartment, which has long been unoccupied, is in Seminole Canyon, near the Texas border, in Val Verde County.

Trenching into the floor, through suffocating clouds of dust, the archaeologists brought up long-buried skeletons of some of the old inhabitants of the apartment, and various scraps and remnants of their clothes and useful possessions—including the large stock of their footwear.

Square toes were the style in this Texas canyon, a thousand years more or less before Columbus found America. Shoes were made sandal fashion, and were of fiber from the yucca plant. Many of the sandals still had tie strings in place when found.

As for the wearers, it is reported that most of them pretty well wore out their shoes. The sizes range from a child's five-inch foot to an Indian brave's ten-inch foot. The archaeologists found only a few obvious "rights" or "lefts."

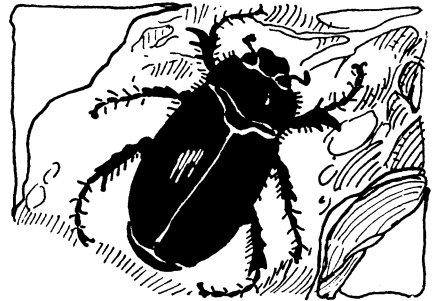
The people who wore these shoes are so new to science that they have not yet received a name. Prof. J. E. Pearce and A. T. Jackson, who reported their exploration of the apartment in the canyon wall, consider this canyon a sort of melting pot for several kinds of early Indian culture. Here were blended ideas from the Basket Maker Indians in Arizona and other parts of the Southwest, ideas from the Big Bend region, and from Central Texas.

Besides the shoes, almost 5,000 articles in all stages of dilapidation have been recovered from the depths of the cave floor. The trash ranged from flint axes and hoes, wooden fire drills, and bone needles, to mussel shell spoons, baskets, a grass bed, and pieces of fiber string. From such fragments of household belongings, many time-worn almost beyond recognition, the life and the appearance of the ancient Texans begins to be understood.

Science News Letter, November 18, 1933



ENTOMOLOGY



Insects, Bugs and Such

THE WORDS "insect" and "bug" are most persistently made to carry more than their legitimate loads of meaning.

Probably the widest understanding of these two terms is that insects and bugs are the same thing, and that any small creeping thing with a lot of legs is an insect or bug. Thus spiders, centipedes, ticks, and sometimes even worms and small crustaceans are lumped as insects. The bigger crustaceans—lobsters, crabs, shrimp and crayfish—we usually exclude from this classification, yet with a feeling that they are "something like insects," too—a sympathy with the Irishman of the anecdote who refused to eat a lobster, because it was "a boog."

It is too bad that this confusion should have arisen, for the words have clear-cut and exact meanings, and properly designate groups of creatures much smaller than their common use covers. An insect is, properly speaking, a small animal with an outside skeleton, six legs, one pair of antennae or "feelers" and four wings. The wing item is a little troublesome, for some insects have but one pair of wings and some none at all; but the basic insect pattern calls for four, and insects with fewer may be regarded as having lost them in the course of evolution. But the three pairs of legs and the one pair of antennae are sure marks of an insect.

All bugs are insects, but not all insects are bugs. In the strict sense of the term, a bug is an insect with a piercing bill folded back under its chest when not in use, and its outer pair of wings modified and usually somewhat shortened, so that the name of the group in the older classifications was Hemiptera, or "half-wing." Typical true bugs are